

MONTHLY JOURNAL OF  
THE MUSHROOM GROWERS'  
ASSOCIATION

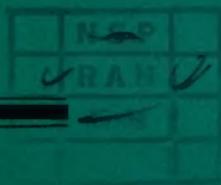
# MGA BULLETIN

JUNE, 1959

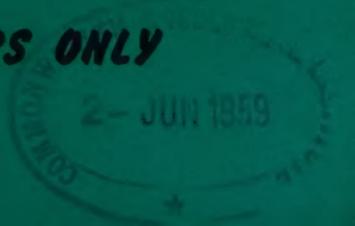
NUMBER 114

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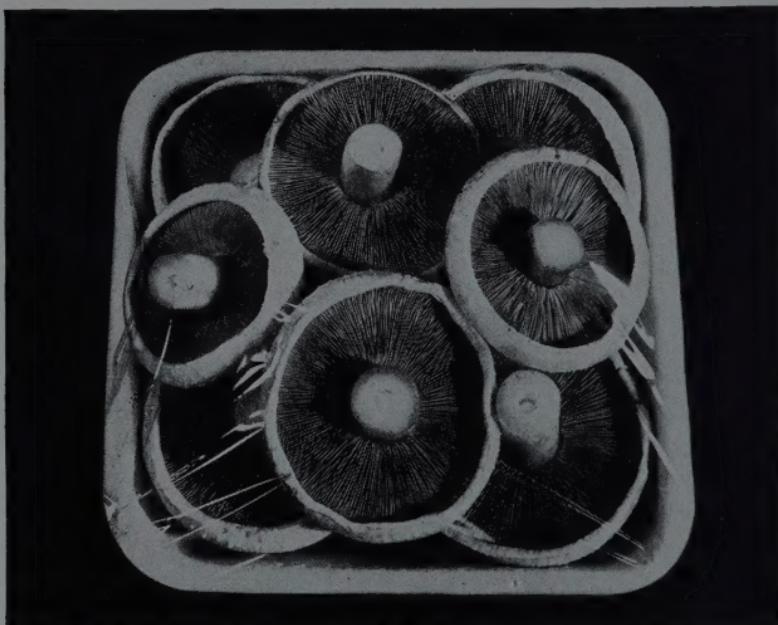
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JUNE - 1959  
NUMBER 114

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**EDITORIAL**

**TIME GENTLEMEN PLEASE**

For many years now the question of whether or no to market stalks has been the focal point of discussion wherever and whenever mushroom growers get together and it would seem, now that market returns are getting lower than ever, that the time has come for the MGA to reach a definite decision on the matter and to make a recommendation to all Grower Members.

It seems to me that the whole problem is linked, quite irrevocably, with the amount of stalk left on the mushroom itself and I for one have no hesitation in saying that a little more stalk, say up to an inch and a half, could and should be left on all mushrooms sent to market.

After all the mushroom stalk is perfectly edible, has a distinct mushroom taste and, what is equally important, gives the mushroom itself stalk and all a slightly longer shelf life, enabling the whole to retain its freshness longer than if the stalk, as at present, is almost completely removed.

Quite rightly, the MGA Publicity Committee claims that the mushroom is the no waste vegetable and, if that is so (and it most certainly is) why this nonsense about stalks?

All of us know quite well that in thousands of restaurants up and down the country stalks and not whole mushrooms are used in various dishes. If in fact whole mushrooms were used and not stalks, (and for that matter, no *boletus edulis* either) the ordinary soup maker as opposed to the soup maker extraordinary who recently appeared at Chichester, will either have to use whole mushrooms or cease making mushroom soup.

Like the immortal Walrus, I too think the time has come. Not to talk of many things but to talk about stalks and to act.

It is extremely doubtful if marketing stalks is profitable any way and certainly it would not be profitable if some of the larger growers marketed them. It is only because they withhold supplies that the stalk market even seems to be worthwhile. It really is time, gentlemen, that you left a little more stalk on and threw the rest away. Why not try it for a week, all growers in the same week, just to see what happens!

WRA

PART 2.....

## BRIEF OUTLINE OF AND CONTROL FOR MUSHROOM PATHOGENS, WEED MOULDS, INDICATOR MOULDS AND COMPETITORS

Prepared by

Dr. L. R. Kneebone and E. L. Merek

of the Department of Botany and Plant Pathology of the Pennsylvania State University for the occasion of the first

### Mushroom Industry Short Course

9th—12th July, 1956, and revised by Dr. Kneebone for the Third Mushroom Industry Short Course, 23rd—26th June, 1958.

**Common Name of Disease**—TRICHODERMA BLOTCH.

**Scientific Name of Causal Organism**—*Trichoderma lignorum*.

**Brief Description of Causal Organism**—The mycelium is greyish but because of the abundance of green spores the mould is one of those commonly referred to as "green mould". Spores are green, 1-celled, ovoid, borne in small terminal clusters or loose heads on the tips of much branched hyaline conidiophores.



**Symptoms Produced**—The mould growing on the soil or around dead butts of mushrooms appears to be a typical "mildew" fungus; however it does not directly infect healthy mushroom tissue. Instead it secretes into the casing layer a toxin which the growing mushroom absorbs. This absorbed toxin causes a dry and sunken brown lesion usually starting on the stem but extending to the cap where the dead area may increase to cover the whole cap. The mould can then grow and sporulate on the dead tissue. The lesions produced may be deep and not superficial like those of *Verticillium*. In extreme cases streaks of dead tissue may be formed in the stem and these may cause splitting of the stem.

**Brief Life History of Causal Organism**—The spore germinates on dead mushroom tissue or on organic matter in the soil. The greyish mycelium develops and spore heads are formed. These spores are then readily disseminated to cause numerous secondary infections.

**Most Frequent Source(s) of Infection**—Soil, air.

**How Spread**—Airborne, spread by watering, careless trashing.

**Predisposing Factors to Infection**—Incompletely decomposed organic matter in casing soil, stumps of old mushrooms, wet surfaces and high humidity.

**Suggested Control Measures**—Zineb dust as often as three times a week at rate of  $\frac{1}{4}$  lb. of 15% dust per 1,000 sq. ft.; early detection and immediate local hand-application of 15% calcium hypochlorite powder so as to completely cover the small infected areas; minimize the favourable conditions of wet surfaces and high humidity; choose soil with little incompletely decomposed organic matter; trash butts after each break.

**Common Name of Disease—GREEN MOULD.**

**Scientific Name of Causal Organism—***Penicillium spp.*

**Brief Description of Causal Organism—**This is large genus of mostly saprophytic moulds. The species are of many colours but those frequently encountered on mushroom casing soil, woodwork and cobs in synthetic compost are various shades of green. The mycelium is usually colourless. It gives rise to erect conidiophores branched near the apex to form a brush-like structure which ends in specialized cells (phialides) that produce dry spores in chains. The spore masses may be colourless or brightly coloured. Species of the genus are harmless to the mushroom crop directly, although their occurrence can be a source of worry inasmuch as they can be confused with harmful genera such as *Trichoderma*.

**Symptoms Produced—**The mould colonies are usually pigmented and are very obvious as granular patches on the soil surface, on dead mushroom tissue and on woodwork.

**Brief Life History of Causal Organism—**Spores of this mould are present in abundance almost everywhere. The airborne spores germinate on most moist surfaces and the growing mycelium soon produces many spores which can then be disseminated to germinate on other moist spots.

**Most Frequent Source(s) of Infection—**Air.

**How Spread—**Airborne.

**Predisposing Factors to Infection—**Typical saprophytic mould which grows prolifically under a wide range of environmental conditions.

**Suggested Control Measures—**No control necessary since mushroom crop is not affected directly; however it is known that certain mites feed on the spores of these moulds, so to deny this source of food for the mites, the mould patches should be eradicated by the use of 15% calcium hypochlorite sprinkled so as to cover the mould.

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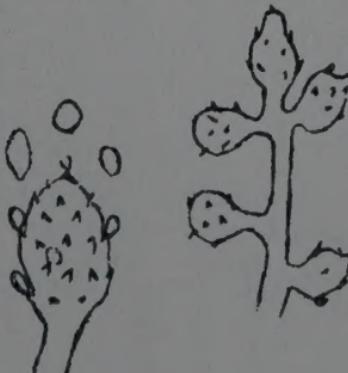
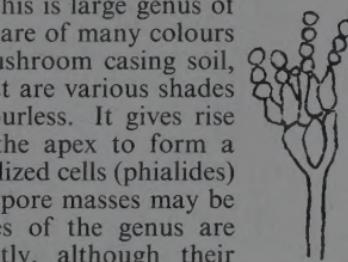
**Common Name of Disease—BROWN MOULD.**

**Scientific Name of Causal Organism—***Phymatotrichum sp. (Botrytis)*

**Brief Description of Causal Organism—**

Mycelium is greyish but the mould exhibits a tan to light brown appearance due to the lightly pigmented spores which are spherical to oblong, 1-celled, and borne in loose heads on inflated tips of stout, branched conidiophores.

**Symptoms Produced—**The mould does not infect healthy mushrooms but grows rapidly and superficially on the soil, frequently spreading out on to the soil from mould colonies growing on side-boards. When the mould infestation is severe, breaks are retarded and yields



are diminished perhaps due to toxins excreted into the soil by the mould. This mould may also grow in a similar fashion over compost before casing in which case it usually grows up through the soil and continues to spread after casing.

**Brief Life History of Causal Organism**—The spore germinates on the soil at any time after casing and grows rapidly only on the surface. Spores in heads are soon produced and are readily disseminated to initiate new points of mould growth.

**Most Frequent Source(s) of Infection**—Air, soil, infested woodwork.  
**How Spread**—Airborne.

**Predisposing Factors to Infection**—Typical saprophytic mould which grows prolifically under a wide range of environmental conditions.

**Suggested Control Measures**—Detect mould colonies early and sprinkle 15% calcium hypochlorite powder over the whole colony including a 1—2 inch margin beyond the visible circumference of the colony; use wood treated with a recommended non-volatile preservative.

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**Common Name of Disease**—LIPSTICK MOULD.

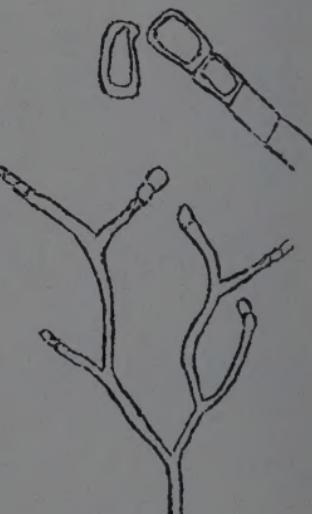
**Scientific Name of Causal Organism**—*Geotrichum sp.*

**Brief Description of Causal Organism**—

The mycelium is white, not abundant and the ends of the hyphae become segmented into chains of 1-celled, short, cylindric spores with truncate ends. Macroscopically the mould begins as white crystalline colonies resembling frost on a windshield or as small cottony balls, but as the mycelium ages the spores are produced and these spores have a reddish pigment so that the white mould gradually takes on a pink colour and finally a cherry red.

**Symptoms Produced**—The mould usually grows slowly at first in the cracks of the casing soil or along the side boards and does not spread out like a mildew or a plaster mould. Gradually it fills in all the cracks of the soil, grows over dead mushroom tissue on the bed surface, and sometimes down into well aerated compost. It is especially abundant along the base of sideboards next to the compost where it seems to grow on the casing soil that has settled there. Mushroom production is greatly reduced, perhaps due to a toxic effect on pin formation and/or development. Mushrooms that mature are not blemished by the mould.

**Brief Life History of Causal Organism**—The spore germinates on moist soil and compost. The mycelium grows through and along the cracks and soon begins to produce spores which can be blown, or splashed along the bed to accomplish fairly rapid spread.



**Most Frequent Source(s) of Infection**—Soil, air, spent compost.

**How Spread**—Air, during watering, picking and trashing.

**Predisposing Factors to Infection**—Seems to prefer same environment as the mushroom.

**Suggested Control Measure**—Soil sterilization; general sanitation including steaming of badly infested houses before emptying; removal from premises of untreated spent compost. Early results using pentachloronitrobenzene—after the appearance of the first break pins—are promising and may make the use of this chemical feasible as soon as residue tolerances are approved. Early localized growths of the mould should be eradicated by the use of 15% calcium hypochlorite powder, applied so as to cover the mould 2" beyond periphery of mould growth.

**Common Name of Disease**—TRUFFLE.

**Scientific Name of Causal Organism**—*Diehlomyces microspora*.

**Brief Description of Causal Organism**—

The mycelium is greyish to white, sparse at first but developing cottony wefts which gradually organize into white, solid, wrinkled masses resembling small brains ("calves' brains"). These are the fruiting bodies or ascocarps inside of which are globoid to oblong sacs containing 1—8 smooth, ellipsoid spores. As these ascocarps mature they become punky, dry and reddish, finally disintegrating into a powdery mass.



**Symptoms Produced**—Spawn in the affected areas seems normal at first, then slowly degenerates into a soggy mass, and finally disappears. Mushroom production may slow up before the pathogen is obvious and eventually no mushrooms develop in areas where the ascocarps form in large numbers.

**Brief Life History of Causal Organism**—Spores of the fungus are very heat resistant and often survive pasteurization and soil treatment. The spore germinates in compost or soil at temperatures above 60° F. The white mycelium grows progressively through the beds fastest at 83° F. but more slowly at lower temperatures. The ascocarps are formed in the compost or on the soil and more spores are herein produced and subsequently disseminated when the compost or soil is disturbed. The spores survive long periods in soil and in infested spent compost.

**Most Frequent Source(s) of Infection**—Soil, compost, dirt composting (area).

**How Spread**—There is a continuous growth of primary infection in a bed; infested spent compost contaminates casing soil or fresh compost.

**Predisposing Factors to Infection**—Wet, soggy compost; spawn growing temperatures above 74° F.; temperatures during production above 60° F.

**Suggested Control Measures**—Avoid ground water run off into compost; reject manure wet with ground water run off; grow spawn at 72° F.

or less; grow crop at 60° F. or less; in England it is recommended to use 1½ lb. of copper sulphate in solution per ton of manure at last turn; trenching 2' beyond last signs of the pathogen; compost on a paved area.

#### Common Name of Disease—MAT.

Scientific Name of Causal Organism—*Myceliophthora lutea*.

#### Brief Description of Causal Organism—

The mycelium is white at first, then yellow to dark tan in mass, rarely profuse, and growth of a particular colony is quite restricted. Several kinds of spores may be produced on the simple hyphae: smooth, ovoid, terminal conidia, borne singly; smooth, thicker-walled chlamydospores which are not always terminal; and thicker-walled, spiny chlamydospores.



**Symptoms Produced**—Growth of the yellowish mould may appear as small sheets or mats beneath the soil and on the surface of the compost of the mould may grow more loosely through the compost, forming small flecks or patches. Production of mushrooms drops off as the mould becomes established and in severe cases yield may cease altogether.

**Brief Life History of Causal Organism**—Spores may come in with inadequately treated soil in which case they germinate and form small mats at the soil—compost line, or spores may survive peak heat within the compost and germinate to form the more flecky type of yellowish growth with occasional mats. Many primary infections may occur simultaneously in a house but secondary spread within the crop is limited.

**Most Frequent Source(s) of Infection**—Soil, compost, air, spent compost.

**How Spread**—Airborne, surface soil water.

**Predisposing Factors to Infection**—Apparently prefers same conditions as spawn.

**Suggested Control Measures**—Thorough soil treatment, preferably steam and formaldehyde to at least 180° F. for 20 minutes using the formaldehyde in the boiler or injected into the steam line at the rate of 1 pint per cu. yd. of soil; steam spent house before emptying so as to attain at least 140° F. for 1 full hour using 1 gal. of formaldehyde per 1,000 sq. ft. of bed area; dispose of spent compost.

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# MORE MUSHROOMS PER SQUARE FOOT!

January 2nd, 1959

The house in question was planted on August 27th, and the first pick was on September 29th. The house is of 1,030 sq. ft.

In eleven weeks from the first pick it had produced 5,261 lbs. or 5.10 lbs. sq. ft., and as we wished to avoid composting over the Christmas period, it was allowed to run a fortnight longer than usual whereupon the ultimate figures were 5,775 lbs., or 5.60 lbs. sq. ft.

It is possible that these figures (which include stalks) may not be believed by some but I assure you that they are quite accurate and truthful, and you are welcome to examine my records if you wish.

In support of the above, the figures of the remaining five houses (all planted with 100% Spawn) which are in crop at the moment, are as follows:-

	11 weeks	-	3.93	lbs.	sq. ft.
9 "	-	5.64	"	"	"
7 "	-	3.24	"	"	"
2 "	-	1.92	"	"	"
1 "	-	.81	"	"	"

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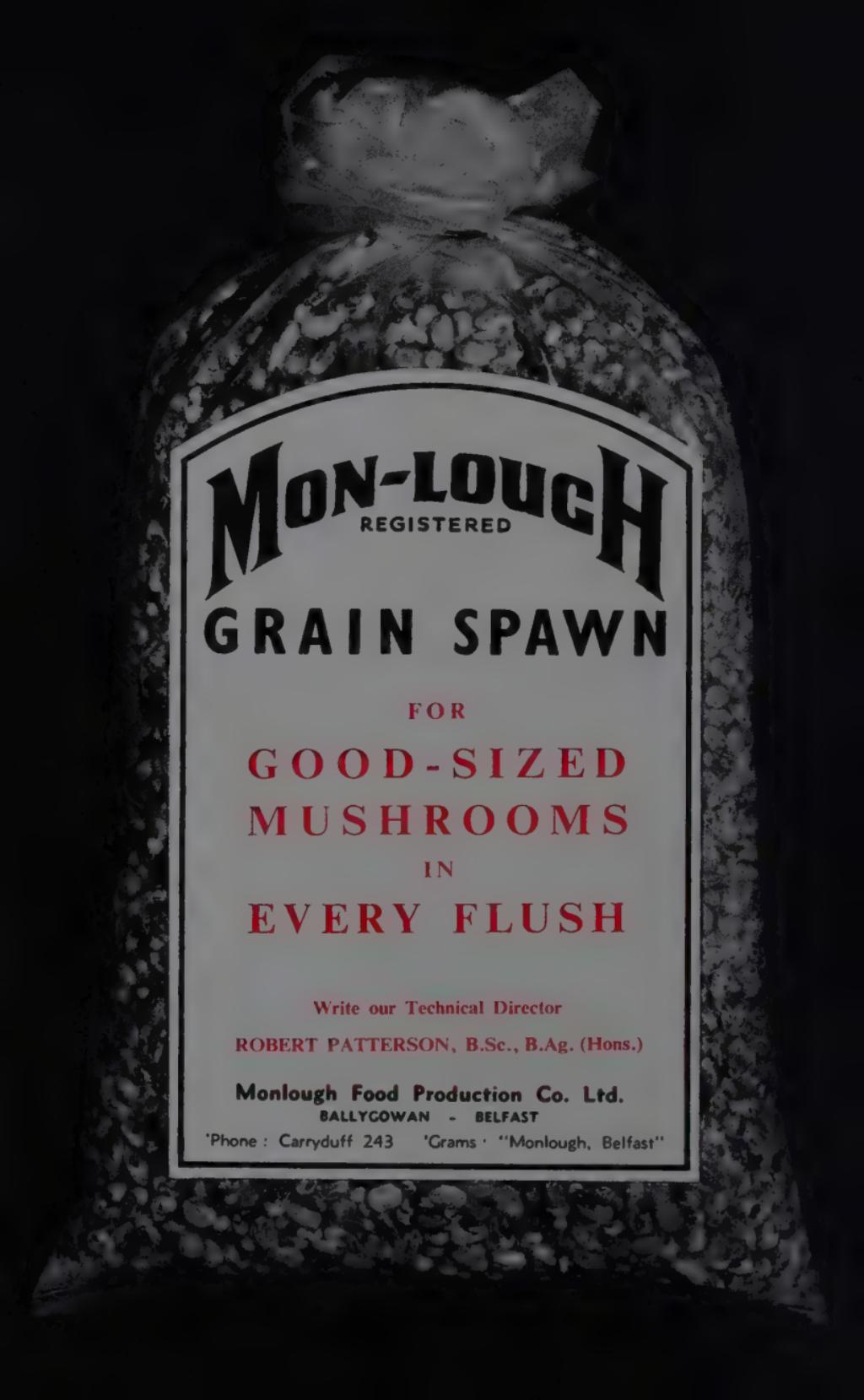
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## WRINGTON VALE NURSERIES—SOMERSET

With about 126,000 sq. ft. of bed space, all on the tray system, Wrington Vale Nurseries, Congresbury, Somerset, owned by Mr. Graham C. Griffiths, member of the MGA Executive, is probably the second largest mushroom farm in England.

As those who attended the recent farm walk at Wrington Vale will know, Mr. Griffiths is modest enough in his production claims— $1\frac{1}{4}$  lb. 5.2 times a year. What he rightly claims is that cost of production is all important and, as he said on the occasion of the farm walk “I am able to make a profit—only because my production costs are kept to a minimum”.

Mr. Griffiths’ experience with mushroom growing actually began in the middle 1930’s and he has been growing mushrooms on his own account since 1946. The mushroom growing business at Wrington Vale has since expanded tremendously and now not only includes the original converted nurseries at the main headquarters of this enterprise, but has expanded into a modern, purpose-built farm a short distance away, complete with its own research section which alone extends to some 18,000 sq. ft.

### Composting:

As far as possible Mr. Griffiths believes in being self-supporting and collects his own stable manure from a radius of some 60 miles around the two farms. Each week 13,000 to 14,000 sq. ft. of beds are laid down. The manure is stacked on Monday and Tuesday morning and around 20% of pig manure is added. To this is added 28 lb. of

Shirley Activator or 56 lb. of concentrated chicken manure per ton of manure, and care is taken to make sure the activator is spread evenly as the manure travels up the elevator of the turning machine. A converted Salopian turns the manure and water is automatically added as the manure passes through the machine beaters. A minimum temperature of about 160° F. is aimed at



One of the compost heaps at Wrington Vale Nurseries

between turns. The first turn is on Tuesday when 20—40 lb. of gypsum is added and composting time has now been reduced to 16 days with three turns. Water is added at both the first and second turns, as required, and gypsum is added at the third turn as well as at stacking.

From stacking the compost heaps are made up to a height of 6 ft. to 7 ft. and a width of 6 ft. and this is maintained following the second turn. At the third turn the width of the stack is reduced to 5 ft. but height is maintained. Trays are filled to a depth of about 6 inches and care is taken to make quite sure that the compost is not too compact in the trays.

### Peak Heating:

Peak heating takes three days with a temperature of between 130° F. and 135° F. by means of steam, fed through a gilled pipe at the top of the house, and air conditioning is considered most important. The aim is to ensure 2.8 changes of air per hour. Compost is considered satisfactory when fire-fang forms, and the house is cooled down by increasing the cool air flow. There is very little air space between trays at peak heating the maximum being 1".



A new Swiss made machine for spawning mushroom compost in depth and which, with a simple adaptation, will also case the mushroom trays, was shown for the first time at the Annual Mushroom Industry Exhibition at Bournemouth in October of last year. With a swing over to deep spawning these machines are being increasingly used in this country and the machine pictured here is at Wrington Vale Nurseries, Congresbury, Somerset.

### Spawning:

One standard carton of spawn is used to about 28 sq. ft. of bed space and spawning in depth, with the new Hauser Spawning and Casing machine, is now practised. The spawn run takes about 12 days, at a temperature of 70—74° F. although, on occasions spawn running is extended to 17—18 days. "It really doesn't seem to make a lot of difference" said Mr. Griffiths.

### Casing:

A mixture of peat and  $\frac{1}{4}$ " limestone with lime (steamed to 212° F.) is the casing material and the trays are cased with a layer about  $1\frac{1}{2}$ " deep.

### Cropping:

For the first four days in the cropping house a temperature of 70° F. is maintained and the first watering takes place on the 5th day and the first fresh air is introduced on the 6th day. Fans with air ducting ensure three air changes per hour. Stroma appears pretty regularly on the beds but is dealt with by covering with a thin layer of casing.

After the 4th day the temperature is gradually dropped and held at 60—62° F. during the main growing period.

Pests and diseases are by no means unknown at Wrington Vale and an attack of Brown Disease a year or two ago had a serious effect

on production, "but I think we've got over it all right now," Mr. Griffiths said. He agrees that farm hygiene is all important in the fight against diseases and thinks too that there is much to commend the increasing tendency to spawn in depth.

Total staff numbers about sixty, including some twenty women engaged on picking, weighing and packing.

The washing of mushrooms by the new Ronjonite system has been carried out at Wrington Vale for several months now and the all-round results have proved most satisfactory.

Wrington Vale is a big undertaking, with its production of up to 200,00 lb. of mushrooms per week at times. There are new houses for the employees and they have their own cricket and skittle team and their own up-to-date canteen.

Mechanisation plays a great part in keeping the production costs down to a minimum and certainly with Mr. Griffiths, cost of production is all important. Oil firing, the use of tractors with fork lifts for handling trays, tippers for emptying houses, and now the introduction of the new Spawning and Casing machine, all play their part in cutting costs. And in time of low selling prices the cost of production per lb. becomes even more important.

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## WORLD'S PRESS DIGEST

Mushrooms were the only really black spot, with consignments far exceeding the demand. *Nurseryman Seedsman*, April 2/59. "No change" was the quote for mushrooms, and dejected salesmen were finding these difficult to sell. *Nurseryman Seedsman*, April 9/59. Trade has strengthened as the week has progressed, with demand strengthened by the cooler weather conditions. *Fruit Trades' Journal*, April 11/59. As is usual during a warm spell, mushrooms are a poor trade. *Grower*, April 18/59. Supplies proved too heavy for demand. *Nurseryman Seedsman*, April 23/59. Mushrooms had a dismal time. Salesmen report that there was practically no feeling whatever from buyers. They just would not take them at any price. One salesman said it was the worst week-end for trade he had ever known. Even the new-boys, who usually jump at them when offered them at 2s. per lb., weren't interested. Reason? Cheap eggs, say some; everyone is on salads, say others. By Wednesday, however, quantities had fallen and prices had improved.

*Grower*, April 25/59.

My own views on how to put matters right for apple and pear growers are simple. 1. Keep low grade fruit off the primary wholesale markets. 2. Encourage, not force, the acceptance and use of the standard grades. 3. Publicise the fact that apples are good but English apples are really the best. The only machinery that I know of which now exists to do this job is the Agricultural Marketing Act; in other words, a Marketing Board.

Giles Tuker in *Commercial Grower*, April 10/59.

Mushrooms, Denmark's favourite vegetable, are now being

exported at the lowest prices in Western Europe to 75 different countries,  
growers announced.

*Southern Evening Echo*, April 29/59.

Mushroom growers reckon that prices here are just about rock bottom. We hear that prices in Belgium are sky-high. Does any British grower feel like having a try at overseas sales? *Grower*, April 4/59.

How much better it would be for the industry as a whole if those tomato growers who squeal the loudest about foreign competition would only get on with the job and follow the example of those who realise that before one can grade one has to grow the right produce—not some of the rubbish to be seen on the markets.

*Fruit Trades' Journal*, April 25/59.

The wholesalers deplore the tendency of direct marketing to retail level, particularly to chain stores, which is developing among large growers and horticultural co-operatives. They may argue that they are perfectly able to handle pre-packs and supply the chain stores. Which tempts one to ask why, with a few notable exceptions, they are not doing so.

*Commercial Grower*, May 1/59.

The catch crop of mushrooms is now finished, and most growers are pleased with the results.

Lea Valley correspondent, *Grower*, April 4/59.

Pure culture spawn, obtained by inoculating a sterile base with selected spores, is 100 per cent. reliable.

H. G. Schaffer in *Popular Gardening*, April 18/59.

The main tendency, in countries belonging to the Common Market, is for growers to seek the advice of experts to select the best seed, and to produce only the very best. *Fruit Trades' Journal*, April 25/59.

May I apologise to Mr. Fred. C. Atkins and others for making a statement regarding mushroom strains to which he called attention and which I cannot now substantiate? I followed, in vain, clues to information which I remember reading, and which I thought were available on my files.\* A. E. Haarer in *Commercial Grower*, May 1/59.

Designed to bring about increased combustion efficiency, fuel additives produced by the Amber Chemical Co. Ltd., 11a Albemarle Street, London, W.1, help in dealing with soot and carbon deposits on heating surfaces, needle seizure, sludge in fuel tanks and lines, sulphur corrosion, corrosive stack emission, and air pollution. *Scope*, May/59.

We feel we should explain the difficulties experienced during the past few months in obtaining supplies of Sorbex peat from North Germany. Our suppliers were unable to dry the peat as necessary during last summer and autumn, and it will be appreciated that similar conditions prevailed throughout the whole industry, which accounts for supplies of Irish, Scotch, English peat, etc., also being in such short supply.

*Memo from Monro*, April/59.

The Irish Turf Board has secured a contract valued at about £50,000 to supply 25,000—30,000 tons of milled peat annually to a London fuel firm. The peat will be used by the British South-Eastern Gas Board to mix with its coke products. *Daily Telegraph*, April 21/59.

\*See *MGA Bulletin* 112 (April, 1959) p. 131

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---

A new name for 99.9 COMPOST MAKER  
but the same high quality, Grower  
Tested product.

## **OR ABUNDANCE SPECIAL MIX**

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Based on 99.9 SOLUBLE BLOOD POWDER.  
Deals effectively with tough Capelle  
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And or your peace of mind you should  
take advantage of our 30 years experience  
in formulating these organic supplements.  
28 lbs. to 40 lbs. per ton, depending on  
quality of manure applied immediately  
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# SANTOBRITE

Ensures a CLEAN START and PRESERVES your  
TRAYS AND WOODWORK



The Best Growers use

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as a Routine Treatment in 10 lb. Bags  
and 80 lb. Cases. Ask for leaflet.



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and all makes of  
smokes and fum-  
igants despatched  
from stock.

- HARLOW - ESSEX  
HARLOW 222, 223, 224

I read that the mushroom industry is in trouble due to over-production. Markets have very definite limitations, and love of money forces man on to produce more and more, not in terms of service to others so much as profit to himself. This can bring only one end, gluts and human suffering.

Chas. H. Humphrys in *Nurseryman Seedsman*, April 23/59.

Motor vehicle batteries can be kept in a constant state of charge by means of the Siemens-Schuckert battery chargery which operates from the electrical supply. Price is £6 10s. Od. from Siemens-Schuckert (Great Britain) Ltd., Great West Road, Brentford, Middlesex.

*Industrial Equipment News*, Mid-April/59.

Mushrooms taking their place in the rotation can be as profitable as those grown under permanent structures, according to Mr. Peter Stanley-Evans, who runs Shackleford Nurseries. Though the weight of mushrooms from the temporary is less than from the permanent, the temporary structure can be used for raising another crop during the months when mushrooms are fetching low prices at the markets . . . . No button mushrooms are marketed. Cups and flats are found to give a better return.

Three-page illustrated article by Ronald Webber in *Grower*, April 11/59.

The "Farmhand" stack mover is suitable for loading haystacks weighing up to as much as nine ton, hauling them over considerable distances and finally unloading them in another position. It is a rear-tilting bed-type mover, loading and unloading by cables and a winch operated from the tractor power take-off. The "Farmhand" will accommodate stacks 16 ft. wide by 24 ft. long. Ten to fifteen stacks can be moved daily by two men. Manufacturers are the Farmhand Co., Hopkins, Minnesota, U.S.A.

*Farm Implement Machinery Review*, April 1/59.

The mushroom crop is a difficult one to grow, demanding much skill and experience and the most careful attention to detail. There is keen competition among growers who, nevertheless, go out of their way to discuss problems with each other, share new ideas, or demonstrate new methods, and in this way ensure that progress continues.

*The Times*, April 6/59.

A water-repellent treatment, known as Stroma, is claimed not only to damp-proof materials which are already dry, but to drive out existing damp. It is effective on horizontal or vertical surfaces of brick, stone, concrete, roughcast and plaster, and has been particularly successful in combatting rising damp in walls and as a damp proof membrane on screeded or concrete floors. Price is about 45s. per gallon, covering 30—40 sq. yd, from Brearley Concrete Units Ltd., Brearley Street, Birmingham 19.

*Industrial Equipment News*, April 1/59.

Work study has resulted in a one-third reduction in labour costs per £1,000 of sales since 1957 in the glasshouse, Dutch-light and market garden departments of the Plant Protection Ltd. research station at Fernhurst.

*Nurseryman Seedsman*, April 9/59.

An electrical appliance that kills flies, moths and other insects, the Saxon Junior, is suitable for areas up to 2,000 cu. ft. and operates simply by plugging into an electrical point. It consumes 10 W. vaporising a tablet which is placed in the top of the apparatus. Price complete with carton of tablets is £3 3s. Od. Carton of extra tablets 5s. from the Tack Organisation, Longmore Street, London, S.W.1.

*Industrial Equipment News*, Mid-April/59.

Although the parent strain of *Botrytis cinerea* did not germinate at first when placed on a sucrose-nitrate agar containing more than 250 p.p.m. of captan, a limited growth, starting at the edges, appeared in two of a large number of plates containing 500 p.p.m. of the fungicide. By transferring some of this growth to agar containing higher concentrations of captan, and repeating the process a number of times, a strain was obtained eventually which grew slowly, but continuously, and sporulated on agar containing 250,000 p.p.m. captan . . . . Strains resistant to ferbam were produced in much the same way. The most important type of resistance in both cases was possessed by the mycelium only, and this resistance was not lost after repeated subculturing on fungicide-free media . . . . Although no strains resistant to thiram, ziram, nabam and zineb were obtained, the results suggest that if similar experiments were done on a larger scale and over longer periods, strains resistant to these fungicides would also be produced.

K. E. Parry & R. K. S. Wood in *Annals of Applied Biology*, Vol. 46, No. 1, March/59.

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## OPEN DAY AT LITTLEHAMPTON

By F. W. Toovey, O.B.E. (Director of the G.C.R.I.)

The Glasshouse Crops Research Institute will be holding its annual Open Day on **Wednesday, 10th June**. This is the occasion when growers and others who support the Institute through its Subscription Scheme are specially invited to visit the Institute to see the work in progress. Although the number of mushroom growers who have so far responded to the invitation to participate in the Subscription Scheme (see MGA *Bulletin*, 109, Jan. 1959, pp.6-7) has been rather disappointing, we know from the wonderful turn-out at the special demonstration held at the Institute last year that there is a keen interest in research among mushroom growers. We hope, therefore, that many more growers will demonstrate their support of the Institute's work by contributing to the Subscription Scheme, and that we shall have the pleasure of seeing a large number of them at our Open Day.

In this short note only a brief mention can be made of the work that visitors will be able to see on the Open Day. A small booklet outlining the research programme and the experiments in progress has been printed, and copies will be issued to all visitors. The demonstrations will of course cover all the main aspects of the Institute's work, not just that on mushrooms, but mushroom growers may rest assured that suitable arrangements will be made to cater for their special interests.

The Institute's research programme on mushrooms now covers a wide field. There are three main lines of work, the study of pests and

their control by insecticides, the study of mushroom disorders of the "Watery Stipe", "Brown Disease" type, and the investigation of the function of the casing layer in relation to the compost in mushroom cultivation. Plans for extending the work into other fields are under consideration, and readers of this *Bulletin* will be aware that the Institute is shortly appointing a geneticist who will be able to give part of his time to spawn research.

### Mushroom Pests

This year most of the work on mushroom pests, which is being carried out by Dr. Hussey and his colleagues, is concentrated on Cecids, and two interesting experiments will be in progress on Open Day. The first is on the effects of Cecids on the yield of two different strains of mushroom, one normal and the other weak, and the second is a trial to compare the effects of BHC, malathion and dimetan on the yield of mushrooms and on Cecid populations. Visitors will also be able to learn something of the studies our entomologists are making on the life histories of four species of Cecid found in mushroom beds, and of the special attention that is being paid to the curious paedogenetic reproduction of these species. The experiments to determine the role of the environment in terminating this larval reproduction will also be described.

### Mushroom Diseases

Miss Gandy is continuing her work on disorders of the "Watery Stipe", "Brown Disease" type, and is at present concentrating on the transmissibility angle. In one of the new mushroom houses visitors will see experiments on the possible transmission of "Watery Stipe" disease by compost and casing material. Previous experiments have shown that when such material from affected crops is inoculated into test plots the spawn usually degenerates rapidly, although the symptoms of "Watery Stipe" are not produced with any severity. In other experimental beds spawn made from cultures derived from mycelium or sporophores from affected crops is being grown. Such cultures often differ markedly from normal, and they are being cropped so that their behaviour throughout the life cycle, and their effect on normal ones, can be studied.

Miss Gandy has also resumed her investigation of Yellow Moulds and will be demonstrating experiments to determine the conditions under which these moulds develop in mushroom compost.

### The Casing Layer problem

Mr. Flegg's work on the casing layer problem has now reached a very interesting stage. Experiments carried out during the past three years have shed new light on the function of this layer, and it has been found that fruiting is related to the general level of moisture stress in it. (In simple language, moisture stress may be defined as the sum total of forces that the mushroom must overcome to absorb water). Thus high moisture stress, corresponding to a dry or saline casing layer, can inhibit fruiting altogether. Increased salinity of the compost has also been found to reduce cropping, and this finding seems to merit closer

# 2

ESSENTIALS FOR GOOD CROPS

# SHIRLEY

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## SPHAGNUM PEAT

(with lump chalk) for CASING

*Full details from*

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WALTHAM CROSS HERTS.

AND AT AYLESFORD, GREAT TOTHAM, PENZANCE, GUERNSEY,  
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attention when considering any improvement in the methods and ingredients used in composting. I am sure growers visiting the Institute on Open Day will find much of practical interest to discuss with Mr. Flegg.

It is hoped that the programme of work outlined above will be of sufficiently wide interest to encourage many of the growers who contribute to our Subscription Scheme to make the journey to Littlehampton to visit the Institute on the Open Day on 10th June. We shall be very pleased to see them, and also any friends they may care to bring along. A letter is being sent to all subscribers asking them to let us know if they are coming, and a detailed programme, which will include information on travelling facilities, will be sent in good time to those signifying their intention to attend.

#### **Environmental factors and Mushroom growth**

Growers are nowadays well aware of the need for a study of the relation between the atmospheric conditions in the growing house (temperature, humidity, air movement) and the growth of mushrooms. Such a study has been initiated at the Institute, and a prototype controlled environment cabinet in which the factors mentioned can be altered at will, has been under trial and will be demonstrated on the Open Day. Eight more cabinets of a similar type are under construction so that experiments under a wide range of conditions can be undertaken. This work will be supplemented by carefully instrumented observations in a growing house.

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### ***BOLETUS EDULIS IS A MUSHROOM***

**So Say Chichester Magistrates**

Summonses alleging that mushroom soup powder was supplied for sale which in fact contained no mushrooms, were dismissed by Chichester Magistrates on 7th May.

The charges were brought by the West Sussex County Council against four firms in all, under the Food and Drugs Act. The firms concerned were Batchelors Foods Ltd., Wadsley Bridge, Sheffield; The Nestle Co., Ltd., of Wood Street, London; Anglo Swiss Products Ltd., Queen Square, Holborn, London, and W. Symington & Co., of Springfield Street, Market Harborough.

By agreement only the case against Anglo Swiss Products was proceeded with and they pleaded not guilty.

Among those who gave evidence for the prosecution was Dr. W. G. Dennis, principal scientific officer at the Ministry of Agriculture; Dr. John Ramsbottom, formerly Keeper of Botany at the British Museum; Dr. R. L. Edwards, formerly Director of the Mushroom Research Association and Mr. G. V. Allen of Bilting, Ashford, Kent, former Chairman of the Mushroom Growers' Association.

It was agreed by the defence that the soup powder in question was made from *Boletus edulis* which was imported in dried form from Europe and elsewhere.

Samples of *Boletus edulis*, specially sent from South Africa, were shown to the Magistrates.

After an absence lasting 55 minutes the Magistrates returned a verdict of "Not guilty".

# *The* CULVERWELL *Manure Turner*

FOR  
MUSHROOM  
GROWERS

• PETROL or ELECTRIC

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£225  
Ex Works

*The  
small  
machine  
with the  
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turnover*

Bruises and aerates—does not shred. CAN BE USED FOR ALL TURNINGS.  
3 men handle 25/50 tons per day. Waters as it turns. Stacks up to 5 feet.  
By using the CULVERWELL MANURE TURNER throughout the whole  
composting process, the work is reduced to the minimum, time taken is  
shorter with improved results.

Will pass through a door 2' 10" x 5' 10" with the detachable wheels removed

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# PUBLICITY FUND ACCOUNT FOR THE

1957		£	f s. d.
	Show Expenses:		
<hr/>			
494	Tea Centre .. .	.. .. ..	— — —
123	Eastbourne Exhibition .. .	.. .. ..	— — —
89	Royal Show .. .	.. .. ..	— — —
27	Food Fair .. .	.. .. ..	— — —
—	Pre-Packaging Exhibition .. .	.. .. ..	223 8 8
808	Display and General Advertising .. .	.. .. ..	1,142 2 11
731	Public Relations .. .	.. .. ..	1,785 14 11
260	Paper Bags and Cartons, <i>less</i> Stock in hand .. .	.. .. ..	670 15 11
82	Cost of Literature, <i>less</i> Sales and Stock in hand .. .	.. .. ..	238 18 10
101	Committee Meeting Expenses .. .	.. .. ..	92 19 8
17	Travelling and Entertainment Expenses .. .	.. .. ..	— — —
750	Administration Expenses .. .	.. .. ..	750 0 0
57	Printing, Postages, Telephone and Miscellaneous Expenses .. .	.. .. .. ..	96 9 8
<hr/> 3,539			
955	<i>Balance</i> being Excess of Income over Expenditure for the year, transferred to Publicity Fund		— — —
<hr/> £4,494			<hr/> £5,000 10 7

## BALANCE SHEET AS AT

### LIABILITIES

1957		£	f s. d.	£	f s. d.
<hr/>					
	SUNDY CREDITORS AND CREDIT BALANCES:				
261	General .. .	.. .. ..	824 1 4		
804	Publicity .. .	.. .. ..	599 11 4		
600	Estimated Subscriptions received in advance .. .	.. .. ..	670 0 0		
				<hr/> 2,093	<hr/> 12 8
	PUBLICITY FUND:				
	Balance as at 1st November, 1957 .. .	.. .. ..	2,276 9 3		
2,276	<i>Less:</i> Excess of Expenditure over Income for the year to date .. .	.. .. ..	222 10 8		
				<hr/> 2,053	<hr/> 18 7
	ACCUMULATED FUND:				
	Balance brought forward—1st November, 1957 .. .	.. .. ..	744 15 9		
	<i>Add:</i> Excess of Income over Expenditure for the year to date .. .	.. .. ..	32 11 6		
745				<hr/> 777	<hr/> 7 3
<hr/> £4,686				<hr/> £4,924	<hr/> 18 6

We hereby certify that the above Balance Sheet has been correctly drawn up in  
 110 CANNON STREET, LONDON, E.C.4.  
 18th March, 1959.

## YEAR ENDED 31ST OCTOBER, 1959

1957		£	s.	d.	£	s.	d.
3,631	Spawn Contribution..	..	..	..	702	15	7
700	Contributions from Salesmen ..	..	..	..	31	10	0
111	Contributions from Sundriesmen ..	..	..	..			
52	Sundry Receipts ..	..	..	..			
					734	5	7
					80	3	6
	<i>Balance being Excess of Expenditure over Income for the year transferred to Publicity Fund</i>						
					4,777	19	11
					222	10	8

£4,494

£5,000 10 7

## 31ST OCTOBER, 1958

### ASSETS

1957		£		£	s.	d.
6	CASH IN HANDS OF SECRETARY ..	..	..			
				25	15	11
	CASH AT NATIONAL PROVINCIAL BANK LTD.:					
238	General Account ..	..	..	983	5	3
3,420	Publicity Account ..	..	..	2,225	16	5
	3,209	1	8			
	SUNDRY DEBTORS AND DEBIT BALANCES:					
702	<i>Less: Reserve for Doubtful Debts</i>	..	..	1,280	0	11
				50	0	0
	1,230	0	11			
	115 STOCK OF SALEABLE LITERATURE (As estimated by Secretary) ..	..	..	290	0	0
50	Stock of Cartons ..	..	..	30	0	0
	320	0	0			
	OFFICE EQUIPMENT—Balance as at 1st November, 1957 ..	..	..	155	0	0
	<i>Less: Depreciation</i> ..	..	..	15	0	0
155				140	0	0
	£4,686			£4,924	18	6

accordance with the books, records, vouchers, information and explanations given to us.

SPENCER, FELLOWS & CO.  
Chartered Accountants.

# COPENHAGEN—NEXT MONTH!

Large Attendance assured

Information which has just come to hand shows that the plans for the Fourth International Congress on the Scientific Aspects of Mushroom Growing, to be held at Copenhagen from 18th July to 26th July are well advanced, and the attendance of growers and others, from all parts of the world will be in the neighbourhood of 300—more than the number attending the very successful Paris conference in 1956.

In all about sixty papers are to be given and those papers which are received in time will be copied and sent out to all delegates some two to three weeks before the conference takes place. In this way delegates will be able to decide on any questions they may wish to ask long before the actual paper is delivered. There will be a session for questions after each paper. During the lectures there will be simultaneous interpretations in French, English and German.

President of the Congress is Prof. H. K. Paludan with Dr. Cecil Treschow (now Director of a large factory producing penicillin) as Vice-President. The Danish Minister of Agriculture, Mr. Karl Skytte is President-of-Honour. The organising committee is made up of prominent personalities in the mushroom industry, representing both growers and other organisations closely connected with the industry. Secretary General is Mr. C. Riber Rasmussen, Director of the Danish Mushroom Research Station and a well-known figure in United Kingdom mushroom growing circles.

The congress will take place at the Royal Veterinary and Agricultural University and is arranged in conjunction with the Mushroom Research Station, the two mushroom grower associations and the Permanent Committee of the International Commission on Mushroom Science.

To help finance the congress the Danish Mushroom Industry, which produces only some four to five million lb. of mushrooms each year, has contributed 25,000 Danish kroner (about £1,300) as a working fund, a highly commendable effort.

No effort has been spared to make the programme as attractive as possible. A short official opening ceremony in the University Lecture Hall on Saturday morning, followed by the opening lunch, precedes a visit to the Danish Mushroom Research Station where many "Congress" experiments have been specially arranged. The fields covered include ventilation, casing soils, mushroom strains, pig manure, the effect of gamma rays, a new technique named 'shake-up spawning' (spawning in depth) which has so far proved most important from a yielding point of view, and a supplementation experiment with five different spawn strains. In the compost shed the main results of six years experimental work at the station will be displayed on 26 big tables. The composting technique adopted at the station, with pig manure supplementation,

will be demonstrated on the spot. An American washing machine will also be on view.

The four lecture days will be grouped under three headings, (1) Pure Science (2) Applied Research and (3) Growers' Problems. Group (1) will not probably, be of great interest to the practical grower although he or she could so easily benefit from the discussions. The remaining two groups are designed to cover that which the practical grower wishes most to hear about.

Among the many speakers will be Dr. E. B. Lambert, Dr. L. Kneebone, Dr. D. Hughes, Dr. C. Aubrey Thomas and Dr. S. S. Block, all of the United States. The many papers, gathered from all over the world, will undoubtedly provide food for interesting discussions and some rather revolutionary ideas are expected to be put forward. Films are being shown daily and a photographic competition is expected to provide additional interest.

On the lighter side two interesting excursions are being arranged specially for the ladies. The general excursion days number three and the programme includes visits to some typical Danish mushroom farms, with shelves and trays included in purpose built and adapted buildings. It is planned to trace the growing shed progress from the glasshouses covered with straw bales through those now insulated by modern methods and so on to the most modern tray farm under construction. In Sweden the delegates will visit the Fammars Trädgård organisation with an annual mushroom production of about 1½ million lb. In addition to the excursions named there will be visits to such places as the Carlsberg Breweries, the Danish Royal Porcelain Factory, Frederiksborg Castle and also to the largest mink farm in Europe owned, incidentally, by a mushroom grower.

The opening lunch and the closing banquet will be held at the Falkoner Centret, a £2½ million establishment completed only last year.

On the publicity side arrangements have been made for mushrooms to be served on the opening day at all the leading restaurants, free of charge, to all who have a meal at those restaurants.

There is still time for you to go if you wish although now you will have to pay the late registration fee of £5 14s. in addition to the standard charges. Late applications should be sent immediately to the MGA Secretary.

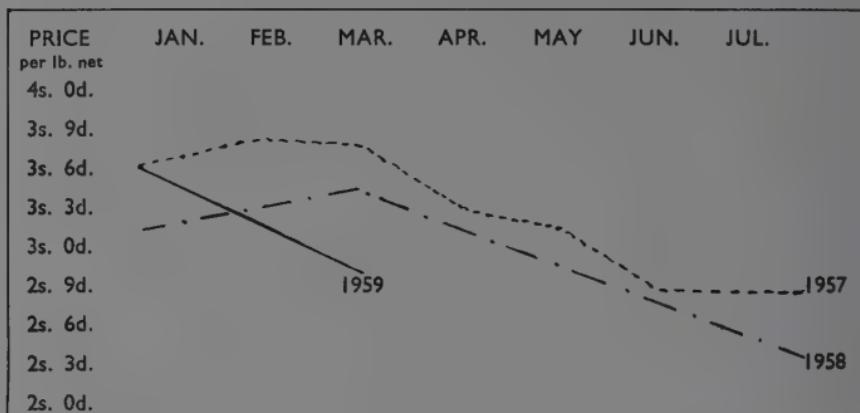
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## MUSHROOMS ON I.T.V.

Have you seen the MGA mushroom films on I.T.V. from Birmingham?

In the "Supermarket" and "Market Place" programmes these films, publicising cultivated mushrooms, are due to be shown on the following dates in June:—1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27 and 29th. Any comments on the films will be welcomed by the MGA Secretary.

## PRICES DROPPING



TO THE EDITOR . . . . .

I do not wish to spread dismay, but the trend of prices in a dozen different markets so far this year is desperately serious. My graph illustrates this—and our quality has been exceptionally good recently. Are all growers experiencing this unseasonal fall-off?

Yaxley, April, 1959.

FRED. C. ATKINS.

**Editor's Note:** Over production and insufficient publicity appear to be the real trouble. Certainly prices this year are lower than ever. Prices in mid-May were disastrous but this is only to be expected during a prolonged hot spell.

### "TROPICALISED" FANS

Over the past few years mushroom growers everywhere have become fully aware of the value of air movement in peak-heat and growing houses and increased attention is being paid to this aspect of mushroom growing.

Propellor fans, suspended from above in inverted positions are, it is claimed, ideal for the purpose and for continuous running over long periods under controlled temperature conditions, these fans should be "tropicalised" i.e., with the motor windings specially insulated to withstand high temperature and high humidity conditions. Such fans are now being marketed by Bellanger Bros. (London) Ltd., of 306, Holloway Road, London, N.7 (Tel. North 4117).



### ARE YOU WORRIED ABOUT COSTS?

If you are worried about your cost of production why not put all your insurances through the NFU Mutual? The MGA Secretary will welcome all insurance enquiries and such enquiries could so easily result in a substantial premium saving.

# You can make better compost more quickly and reliably—with **ADCO 'M'**

SPECIAL MUSHROOM COMPOST ACTIVATOR GIVES  
HIGHER FERMENTATION TEMPERATURES, AND A FIRST  
CLASS COMPOST THAT ASSISTS THE SPAWN RUN

MANY ADVANTAGES are gained by using Adco "M" as an activator in composting. Chief among them is the higher temperature attained both in the compost heap and in the beds during the peak heating process. Look at the results that follow from these higher temperatures.

First of all, fermentation goes ahead at a faster rate. Composting takes less time and the finished product is ready earlier.

Secondly, you have greater assurance that your crop will be free of pests and disease. The higher temperature either kills off the pests inside the heap or drives them to the surface, where they can be dealt with by insecticides. High temperatures during fermentation are particularly vital in preventing disease such as Vert-de-gris, of which there is special danger when composting during the winter months.

#### More nourishment

If you use Racing Stable manure, or other manure in which excess straw is present, the use of Adco "M" is strongly advised. The fermentation of this type of manure takes place more rapidly and effectively when Adco "M" is added. You get a more thorough breakdown of the strawy material, which then becomes available as food for the growing spawn. So your compost provides more nourishment for the mushrooms, and you get a bigger crop.

#### Better spawn run

Adco "M" produces a good quality compost of even texture. It provides an

ideal medium for spawn run and helps to avoid greasy conditions, lack of aeration, and over wet compost – all of which delay mycelium growth. The spawn is able to make more rapid use of the food provided. It establishes itself more quickly and this is again a great help in preventing diseases and weed fungi. The faster the spawn grows and fills the compost the less likelihood is there of disease and weed fungi becoming serious competitors. A quick spawn growth also gives a quicker ultimate production.

You can have freedom from uncertainty in the composting process – by using Adco "M". It will pay you hands down. Adco "M" is specially formulated as a result of years of experiment, for the specific purpose of making mushroom compost. It can be used for composting with straw alone, if you wish. Or it can be used to compensate for variations in the quality and texture of your manure supply. Adco "M" provides the way to better mushroom compost every time.

—Post this coupon for full details—

Adco Limited, Harpenden, Herts

Please send me your leaflet giving full details of Adco "M".

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ADDRESS \_\_\_\_\_

## 1959 PUBLICITY FUND CONTRIBUTORS

Dan Wuille & Co. Ltd., Covent Garden Market, W.C.2	..	100	0	0
Francis Nicholls Ltd., Smithfield Market, Birmingham	..	157	10	0
R. E. Jenkinson Ltd., Covent Garden Market, W.C.2..	..	105	0	0
Wm. Morgan & Co. Ltd., Salesmen, Custom House Street, Cardiff	..	10	10	0
Ernest White Ltd., Salesmen, Kirkgate Market, Leeds	..	5	0	0
C. W. Tooley & Son Ltd., Salesmen, Nottingham	..	2	2	0
Geo. Jackson & Co. Ltd., Smithfield Market, Birmingham	..	50	0	0
Ed. H. Lewis & Sons Ltd., Covent Garden Market, W.C.2 ..	..	5	5	0
Wm. McGrattan & Sons Ltd., Smithfield Market, Manchester	..	5	5	0
G. W. Jackson (Cardiff) Ltd., 11 Custom House Street, Cardiff	..	10	10	0
C. Snowdon & Co. Ltd., Castlefolds Market, Sheffield	..	12	10	6
E. Broadbelt Ltd., Smithfield Market, Manchester	..	15	15	0
Dan Wuille Ltd., 79 Candleriggs, Glasgow C.1..	..	25	0	0
T. J. Poupard Ltd., Covent Garden, London, W.C.	..	115	0	0
Reuben Levy Ltd., 88 Spitalfields Market E.1	..	5	13	8
Jackson & Lakin Ltd., Nottingham	..	3	3	8

### Sundriesmen:

Bradford Fertilizer Co. Ltd., Whitefield Place, Gillingham, Bradford	10	10	0
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### \*Spawn Merchants:

Monlough Food Production Co. Ltd., Ballygowan, Belfast.

S. A. F. Sampson Ltd., Oving, Chichester, Sussex.

H. Mount & Sons Ltd., Littlebourne, Canterbury.

W. Darlington & Sons Ltd., Southcourt Road, Worthing.

White Queen Ltd., Yaxley, Peterborough

\*Amounts collected by Spawn Merchants are not for publication.

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